Chapter 9 A view of Earth's Past

9.1 Geologic Time

I. The Geologic Column

A. The constant change in Earth's surface is recorded in the rock layers of Earth's crust

B. The geologic time scale outlines the sequence and length of change of Earth's crust and life on Earth

C. Geologic column – an ordered arrangement of rock layers that is based on the relative ages of rocks; oldest rock on bottom of column

1. The closer a fossil is to the top of the geologic column, the younger it is

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D. Using a Geologic Column

1. we can use the geologic column to estimate age of rock that cannot be measured radiometrically

II Divisions of Geologic Time

A. Geologic history of Earth is marked by major changes in Earth's surface, climate, and types of organisms

→ see Table 1, p. 213

1. Mega – annum = one million years

B. Eons and Eras

1. Eon = largest division of geologic time

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a. 4 Eons: Hadean, Archean, Proterozoic, Phanerozoic
→ First 3 eons are part of Precambrian time, 4 billion years ago

2. Era - unit of geologic time that includes two or more periods

C. Periods and Epochs
1. Period - a unit of geologic time that is longer than an epoch, but shorter than an Era
2. Epochs - < period and > age
3. Ages - distinct fossils in fossil record define ages

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9.1 Review

Grade: 9th
Subject: Earth Science
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1 The largest division of geologic time is a(n) _____.

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2 Unit of geologic time that includes two or more periods is a(n) _____.

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3 The standard method that divides Earth's history into parts is radiometric dating.

Geologic time scale

True

False

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4 Which era ended with the largest mass extinction in Earth's history?

A Paleozoic
B Mesozoic
C Cenozoic
D Jurassic

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5 Which era are we in now?

A Paleozoic
B Mesozoic
C Cenozoic
D Jurassic

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6 What does the rock and fossil record represent?

A index fossils
B geologic time
C the Age of Reptiles
D the Age of Mammals

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9.2 Precambrian Time and the Paleozoic Era

I. Evolution
- A. Fossils indicate the kind of organism that lived when rock formed
  1. The examination of fossils in rock layers will help us understand the organisms that lived in that time
  2. Evolution is the gradual development of new organisms from pre-existing organisms
- B. Evolution and Geologic Change
  1. Major geologic and climatic changes can affect species survival

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II Precambrian Time
- A. Precambrian time - the time interval in the geologic time scale from Earth's formation to Paleozoic Era (4.6 bill. → 542 mil ago)
  1. We know very little about events / life during Precambrian time
     a. most rocks have been altered by tectonic activity preventing an effective analysis of the rock's history
- B. Precambrian Rocks
  1. Large areas of Precambrian rocks are called shields
- C. Precambrian Life - rare because most organisms lacked shells or bone
  1. Stromatolites - reef-like deposits formed by blue-green algae (fossilized)

III The Paleozoic Era - the geologic era that followed Precambrian time and that lasted from 542 mil to 251 mil years ago
- A. Cambrian Period - first possible vertebrates
- B. Ordovician P. - modern, oxygen-rich atmosphere formed
- C. Silurian P. - first land plants
- D. Devonian P. - first amphibians + fishes
- E. Carboniferous P. → Mississippian + Pennsylvanian
  1. Pennsylvanian - first reptiles appear
- F. Permian P. - formation of Pangea is complete mass extinctions occur

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9.2 Review

Grade: 9th

Subject: Earth Science

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1 The gradual development of new organisms from preexisting organisms is called...

A natural selection
B mass extinction
C evolution
D environmental change

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2 Which of the following accurately characterizes Precambrian rock?

A it has been severely damaged
B it has many fossils
C it has clearly identifiable layers
D it contains much limestone

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3 The division of geologic time that makes up about 88% of Earth's history is called...

A the Paleozoic Era
B the Cambrian Period
C Precambrian time
D the Permian Period

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4 Scattered landmasses on Earth merged into a supercontinent during the....

A Precambrian time
B the Cambrian Period
C the Permian Period
D the Paleozoic Era

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5 The Devonian Period is also known as the ...

A Age of mammals
B Age of Fishes
C Age of Reptiles
D Carboniferous Period

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6 A large area of exposed Precambrian rocks is known as a .... shield

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7 The most common precambrian fossil is a _____.

stromatolite

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9.3 The Mesozoic and Cenozoic Era

I. Mesozoic Era
- A. At the Permian Period, 90% of marine organisms and 70% of land organisms died
- B. Mass extinction- episode during which an enormous #of species die
  1. This left many resources for the few life forms remaining
  2. Many new life forms appeared after the Permian Mass extinction
- C. Mesozoic Era (251-65 ma)
  1. Earth's surface changed dramatically during the Mesozoic
  2. Conditions of Mesozoic Era favored reptiles; called "Age of Reptile"
- D. Three Periods of Mesozoic: Triassic, Jurassic, Cretaceous
  1. Triassic- dinosaurs appear, thick forests and cycads appear
     a. cycads- plants that resemble palm trees
     b. Ichthyosaurs appear in oceans
  2. Jurassic- dinosaurs are the dominant life form; birds appear

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  3. Cretaceous- plants become highly evolved, angiosperms appear (flowering plants). T-Rex dominates
- E. Cretaceous-Tertiary Mass Extinction
  1. Ended w/ mass extinction event; end of dinosaurs
     a. Impact hypothesis- theory that a giant meteorite caused extinction

II Cenozoic Era (65.5 Ma to present)
- A. Age of Mammals; continents shift to their present day location
- B. Quaternary and Tertiary Periods (two periods of Cenozoic Era)
  1. Tertiary Period= 5 Epochs Paleocene, Eocene, Oligocene, Miocene, Pliocene
  2. Quaternary Period- Pleistocene + Holocene Epochs
  3. Paleocene + Eocene Epochs- many new mammals; small rodents appear
  4. Oligocene and Miocene Epochs: deer, wolves, foxes appear
  5. Pliocene Epoch- bear, dogs; land bridges appear between Eurasia + NA and SA + CA
  6. Pleistocene- first fossils of humans appear
  7. Holocene- 11,500 years ago; after last glacial period

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9.3 Review

Grade: 9th

Subject: Earth Science

Date: 1/17

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1 The mass extinction at the end of the Permian Period led to ...

A fewer resources during the Mesozoic Era

B abundant new life-forms in the Mesozoic and Cenozoic Eras

C delayed evolution of new species in Cenozoic Era

D little environmental change in the mesozoic Era

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2 The two major groups of dinosaurs during the Jurassic Perido were the saurischians and the ...

A pterosaurs
B ichthyosaurs
C ornithischians
D herbivores

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3 According to the impact hypothesis, dinosaurs became extinct when ...

A the continents underwent great movement
B a giant meteorite crashed into Earth
C volcanic activity increased
D Earth's climate became much warmer

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4 A plant that resembled a palm tree in the Triassic forests was the cycad.

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5 The Cenozoic Era was known as the ...

A Age of Reptiles
B Age of Fishes
C Age of Evolution
D Age of Mammals

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6 The Pleistocene Epoch was characterized by ....

A a mass extinction
B the repeated advance and retreat of ice sheets
C a warm, humid climate
D a rapidly warming climate

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7 The _____ was a reptile that lived in the Triassic Oceans.

ichthyosaur

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Chapter 9 Review

Grade: 9th

Subject: Earth Science

Date: 1/22/13

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1 The geologic time scale is a ...

A scale for weighing rocks
B scale that divides Earth's history into time intervals
C rock record of Earth's past
D collection of the same kind of rocks

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2 Scientists are able to determine the absolute ages of most rock layers in a geologic column by using ...

A the law of superposition
B radiometric dating
C rates of deposition
D rates of erosion

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3 To determine the age of a specific rock, scientists might correlate it with a layer in a geologic column that has the same relative position and...

A fossil content
B weight
C temperature
D density

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4 Geologic periods can be divided into

A eras
B epochs
C days
D months

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5 Precambrian time ended about...

A 4.6 billions years ago
B 542 million years ago
C 65 million years ago
D 25 thousand years ago

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6 The most common fossils that occur in Precambrian rocks are...

A graptolites
B trilobites
C eurypterids
D stromatolites

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7 The first vertebrates appeared during ...

A Precambrian time
B the Paleozoic Era
C The Mesozoic Era
D the Cenozoic Era

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8 The "Age of Reptiles" is the name commonly given to ...

A Precambrian time
B the Paleozoic Era
C the Mesozoic Era
D the Cenozoic Era

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9 The first flowering plants appeared during the ...

A Cretaceous Period
B Triassic Period
C Carboniferous Period
D Ordovician Period

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10 The "Age of Mammals" is the name commonly given to

A Precambrian time
B the Paleozoic Era
C the Mesozoic Era
D the Cenozoic Era

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11 The Methuselah tree in California is 4.6 x 10^3 years old. How many times older than this tree is Earth?

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12 Dinosaurs first became the dominant life-forms during which geologic period?

A quaternary period
B jurassic period
C triassic period
D cretaceous period

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13 Pangaea broke into seperate continents during ...

A the Paleozoic Era
B the Mesozoic Era
C the Cenozoic Era
D Precambrian time

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14 What is the term for the largest unit of geologic time?

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15 What is the term for the gradual development of organisms from other organisms by means of natural selection?

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16 Human civilization developed during which of the following periods?

A triassic period
B jurassic period
C tertiary period
D quaternary period

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17 Why are fossils rarely found in Precambrian rock?

A most Precambrian organisms did not have hard body parts that commonly form fossils
B Precambrian rock is buried too deeply for geologists to study it
C most precambrian organisms were too small to leave fossil remains
D precambrian rock is made of a material that prevented the formation of fossils

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18 Which of the following statements describes a principle of natural selection?

A the environment has more than enough resources to support all of the individuals that are born in a given ecosystem

B only individuals well-suited to the environment are likely to survive and reproduce

C individuals in a healthy population are identical and have the same traits

D most species produce plentiful offspring that will all live until maturity and reproduce

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